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ABSTRACT

Research on effective beginning reading instruction has helped to define what instructional methods and content are most valuable. The research has shown that three important aspects of beginning reading instruction are alphabetic principles, reading fluency, and reading comprehension. A review of research in Part 1 of this Technical Paper discusses some of the instructional issues regarding these three areas of curriculum focus. Part 2 discusses the need for higher elementary reading achievement and includes 3 graphs that show 4th grader reading performance by: eligibility for free/reduced lunch, location of school, and ethnicity. Part 3 provides a detailed description of the core early elementary PLATO[R] resources "Beginning Reading for the Real World" and "Projects for the Real World." Across four levels, A to D, the "Beginning Reading for the Real World" program provides numerous opportunities for elementary students to learn and use letter-sound connections, context cues, comprehension, and reasoning skills. Target students, instructional emphasis, and activities presented are outlined for each of the four levels. Curriculum organization, instructional elements, and use of the curriculum are discussed in the section highlighting "Projects for the Real World." A table provides information on units, essential reading skills, and grammar/editing skills for Levels A-I (grades K through 8). Part 4 focuses on teaching with "Beginning Reading for the Real World." (Contains 44 references.) (AEF)

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PLATO®

Teaching Beginning Reading with PLATO Courseware: An Overview of the New PLATO Beginning Reading Solution and How to Use It

Technical Paper #10

September, 2001

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Executive Summary

Research on effective beginning reading instruction has helped to define what instructional methods and content are most valuable. Recent reports summarizing this research have focused educators and others across the country on what works best in teaching children to read. The research has shown that three important aspects of beginning reading instruction are alphabetic principles, fluency, and comprehension.

- Alphabetic principles include phonemic awareness and phonics instruction, both of which are key for beginning readers.
- Reading fluency—reading with accuracy, speed, and proper expression—is the result of learning alphabetic principles and sight words/phrases to the point of automaticity. Fluency is built by extensive reading practice across a wide range of text types.
- Reading comprehension is promoted by instruction in vocabulary, text awareness, reading strategies, and by successful teacher preparation. Again, extensive practice reading for a purpose is a critical element in building reading comprehension.

Reading capability has been the subject of public concern for decades. Far too many children cannot read well and are therefore precluded from learning what they might, both in and outside of school. Particularly affected are at-risk students in urban and rural schools who have relatively fewer home and community supports. Effectively addressing this situation holds out great promise for the social and economic future of America.

Improved reading curricula and teaching methods are needed if the reading abilities of America's children are to increase. Research results have yielded insight into how to change reading instruction. The *PLATO Beginning Reading for the Real World* curricula are designed to implement effective, research-based instructional practices.

Beginning Reading for the Real World is designed to give elementary grade users the phonetic and comprehension skills to decode print and make sense of text. Across the four levels A to D, this program provides numerous opportunities in 24 lessons and 108 activities for students to learn and use letter-sound connections, context cues, comprehension, and reasoning skills in their quest to become independent readers, writers, and thinkers. This curriculum can be used alone or in conjunction with *Projects for the Real World*.

Projects for the Real World include activities such as map reading and labeling, graphs, photos of Maya ruins and planets, planning, and writing. That's not only integration across the disciplines; it's interesting and fun. In Levels A through I (grades K-8), 46 units include 245 projects with a total of 793 activities, all with a great variety of student activity. Not only do students read, but they are asked to demonstrate what they read and what they can do with the information. In one project a student can be asked to label pictures, do addition in order to answer questions, draw pictures, write letters and words, and play learning games.

Together, *Beginning Reading for the Real World and Projects for the Real World* offers over 350 hours of instruction and practice in reading skills and strategies. These courses can be combined with the other highly successful PLATO courses, particularly *Essential Reading Skills*, *Fundamental and Intermediate Reading Strategies*, and *Vocabulary and*

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Reading Comprehension: Stories and Literature; Information and Expository Text, to present a full range of resources to move learners from beginning readers to successful readers.

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Part 1

Research on Effective Beginning Reading Instruction

This review of reading research focuses on the instructional practices that have been demonstrated as being effective for beginning readers. These practices are the research base for PLATO beginning reading curricula.

A key finding from current reading research is that there is no "one best way" to teach a particular reading skill or capacity. A variety of instructional methods and reading approaches have been shown to be effective, depending upon the instructional objective and student characteristics. An effective reading program will likely involve a mix of instructional approaches, including direct instruction on well-structured tasks and problem-solving activities utilizing more open assignments and methods. Individual interests and learning needs should be recognized in the reading instruction. A broader, more comprehensive review of these issues in the reading process can be found in Technical Paper #7, *Teaching Reading with PLATO*.

While a range of instructional methods has proven successful in teaching beginning reading, three areas of instructional focus have proven especially effective in helping young, beginning readers learn to read:

1. Alphabetic principles, including phonemic awareness and phonics instruction
2. Fluency including reading with accuracy, speed, and expression
3. Comprehension as promoted by vocabulary instruction, text comprehension instruction, and teacher preparation and comprehension strategies instruction

This review of research discusses some of the instructional issues regarding these three areas of curriculum focus.

Alphabetic Principles

Beginning readers with little prior print experience need explicit instruction in the alphabetic principles of reading: letter identification, phoneme recognition and discrimination, phonemic awareness and phonics skills. Two areas of alphabetic principles shown to be most important in teaching beginning readers are phonemic awareness and phonics.

Phonemic Awareness

Phonemic Awareness (PA) is a vital skill for young children to develop. PA means that a child understands that spoken words are made up of a sequence of sounds and that these sounds correspond to letters of the alphabet. Understanding the alphabetic principle and developing greater phonemic awareness is the first step in developing literacy.

The importance of PA has been well documented in the educational research (viz., Ball & Blachman, 1991; Adams, 1990; & Adams, Forman, Lundberg, & Beeler, 1998). For instance, PA has been identified as the single best predictor of a child's future reading ability and can account for as much as 50% of the variance in reading ability during the first 2 years of instruction (Share, Jorm, Maclean, & Matthews, 1984). Blachman (2000),

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Ehri (1979), Stahl and Murray (1994), and Wagner and Torgesen, (1987) also report a strong correlational relationship between PA and learning to read. Bradley and Bryant (1983, 1985) have provided evidence for a causal relationship between PA and reading ability as well. In a recent meta-analysis of PA, the National Reading Panel (2000) determined that the effect size of PA on reading instruction (for 52 different published studies that included control conditions) was significant (effect size of 0.53). The importance of PA is further underscored by research reporting that people who have not been taught to read or write have great difficulty performing PA tasks (Morais, Bertelson, Cary, & Alegria, 1987), and that poor PA is a strong predictor of reading difficulties in the teenage years (Bradley & Bryant, 1983).

Children do not intuitively learn that spoken language is segmented into constituent parts (Williams, 1980). Adams (1990) suggests that PA be explicitly taught. Consequently, a strong and explicit PA component is needed in the curriculum. The most widely used instructional activities directed explicitly at teaching phonemic awareness skills are (National Reading Panel, 2000, p. 2-2):

- Phoneme isolation, which requires recognizing individual sounds in words, for example, "Tell me the first sound in paste." (/p/)
- Phoneme identity, which requires recognizing the common sound in different words. For example, "Tell me the sound that is the same in bike, boy, and bell." (/b/)
- Phoneme categorization, which requires recognizing the word with the odd sound in a sequence of three or four words, for example, "Which word does not belong? bus, bun, rug." (rug)
- Phoneme blending, which requires listening to a sequence of separately spoken sounds and combining them to form a recognizable word. For example, "What word is /s/ /k/ /u/ /l/?" (school)
- Phoneme segmentation, which requires breaking a word into its sounds by tapping out or counting the sounds or by pronouncing and positioning a marker for each sound. For example, "How many phonemes are there in ship? " (three: /š/ /I/ /p/)
- Phoneme deletion, which requires recognizing what word remains when a specified phoneme is removed. For example, "What is smile without the /s/?" (mile)

The National Reading Panel's (2000) meta-analysis identified a number of instructional characteristics of more effective PA teaching (p. 2-6).

> *The NRP findings indicate that PA instruction may be most effective when children are taught to manipulate phonemes with letters, when the instruction is explicitly focused on one or two types of phoneme manipulations rather than multiple types, and when children are taught in small groups. Of course, instruction must be suited to students' level of development, with easier PA tasks appropriate for younger children. Teaching with letters is important because this helps children apply their PA skills to reading and writing. Teaching children to blend phonemes with letters helps them decode. Teaching children phonemic segmentation with letters helps them spell. If children have not yet learned letters, it is important to teach them letter shapes, names, and sounds so that they can use letters to acquire PA. PA instruction is more effective when it makes explicit how children are to apply PA skills in reading and writing tasks. PA instruction does not need to consume long periods of time to be effective. In these analyses, programs lasting less than 20 hours were more effective than longer programs. Single sessions lasted 25 minutes on average. Classroom teachers as well as computers can teach PA effectively.*

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It is important to note that the meta-analysis established that phoneme manipulation with letters helped both normally developing readers and at-risk readers acquire PA better than instruction without letters.

Phonics/Phonological Awareness

Phonological Awareness is a child's sensitivity to the patterns of spoken language that recur and can be manipulated without respect to the meaning that the language patterns ordinarily convey (paraphrase taken from Snow, Burns, & Griffin, 1998, p. 111). Phonological awareness is often confused with phonemic awareness. Phonemic awareness refers to a child's understanding of the sounds of individual letters and simple blends. Phonological awareness is a more inclusive term that refers to a child's ability to decode representations of more complicated combinations of letters and learn spelling.

Research from several disciplines provides strong evidence for the importance of developing phonological skills in learning to read (Adams, 1990; Blachman, 1997a; Rieben & Perfetti, 1991; Share 1995; Stanovich, 1992). How children perform on phonological awareness measures is a powerful predictor of future reading achievement (Bryant, Maclean, Bradley, & Crossland, 1990). It has also been found that children who lack this phonological insight are likely to be among the poorest readers (Blachman, Ball, Black, & Tangel, 1994). Catts (1991a, 1993) found phonological measures and the naming of objects could predict 83 percent of the children's reading outcomes correctly. Finally, a reciprocal causal relationship between early phonological awareness and early literacy acquisition has been established in the reading research (Snow, Burns, & Griffin, 1998).

The National Reading Panel recently conducted a meta-analysis of studies that examined phonics instruction. The panel (2000) reported that systematic phonics instruction, that is, the explicit teaching of a set of specific letter sounds and having children read text that provides practice in using these relations to decode words, contributed more to children's growth in reading than unsystematic phonics instruction or alternative treatments. There was no single systematic phonics program that outperformed the others. The phonics instructional approaches studied include:

- Synthetic Phonics—Teaching students explicitly to convert letters into sounds (phonemes) and then blend the sounds to form recognizable words.
- Analogy Phonics—Teaching students unfamiliar words by analogy to known words (e.g., recognizing that the rhyme segment of an unfamiliar word is identical to that of a familiar word, and then blending the known rhyme with the new word onset, such as reading *brick* by recognizing that *-ick* is contained in the known word *kick*, or reading *stump* by analogy to *jump*).
- Analytic Phonics—Teaching students to analyze letter-sound relations in previously learned words to avoid pronouncing sounds in isolation.
- Phonics through Spelling—Teaching students to segment words into phonemes and to select letters for those phonemes (i.e., teaching students to spell words phonemically).

The panel also reported that systematic phonics instruction was significantly more effective than non-phonics instruction in helping to prevent reading difficulties among at risk students especially in the 1st grade (an effect size of d = 0.74). This effect was not significant at the 2nd grade level and beyond however, suggesting a critical window of opportunity in which to teach phonics. Systematic phonics instruction was also very effective in improving children's ability to decode regularly spelled words and it produced considerable growth in spelling among kindergartners and 1st graders but not among older students. In general the panel found that phonics instruction taught earlier (i.e., before the second grade) was much more effective that phonics taught later. Finally, the

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panel indicated that systematic phonics instruction helped children at all social-economic-status levels make gains in reading than did other forms of instruction.

The above research underscores the importance of teaching phonological skill to early readers. As the panel suggests, the 1st grade cohort consistently benefits the most (on several different reading measures) from systematic phonics instruction. Further, these gains are not tied to social economic status (SES). Snow, Burns, and Griffin (1998) state that phonics instruction is even more effective when combined with instruction that connects the phonological segments to letters (p. 486). Snow, Burns, and Griffin (1998) also state that an important implication of the research on phonics is that teachers need to understand and provide for the individual differences in phonological awareness that they will encounter in their classrooms (p. 496). Share (1995) suggests that becoming skilled in phonological decoding provides children with a self-teaching mechanism that is useful for learning to read words that they have not previously encountered. Finally, research has shown that direct instruction improves phonological awareness (Blachman, 2000).

Fluency

Recent education literature suggests that fluency is a critical element in skilled reading (NRP, 2000; Snow, Burns, Griffin, 1998). In order for children to become adept readers they must become proficient in the mechanics of reading. Specifically, children need to develop fast and automatic word recognition processes, rapidly use punctuation, and group words into meaningful units (NRP, 2000). Developing these skills reduces the cognitive load associated with decoding, freeing up resources for understanding the text (comprehension).

Snow, Burns, and Griffin (1998) posit that fluency is best understood as the development and oscillation of two different foci— form-focused and meaning-focused reading. Mature, fluent, and well-practiced readers rely upon the automatic processing of form and focus on meaning but can rapidly switch to decode unfamiliar words. Allington (1983) describes fluency as the ability to read a text quickly, accurately, and with the appropriate expression.

Fluency has been largely ignored in the classroom (Allington, 1983). Ignoring fluency has negative consequences. The National Assessment of Educational Progress conducted a large study on fluency achievement in U.S. schools (Pinnell et al., 1995) which concluded that 44% of students sampled were disfluent with grade-level materials. The study also reported relationship between fluency level and reading comprehension.

In its recent meta-analysis examining the effectiveness of methods for teaching fluency, the NRP identified an instructional approach that promotes literacy— guided repeated oral reading practice.

> *Guided repeated oral reading techniques share several key features. First, most of these procedures require students to read and reread a text over and over. This repeated reading usually is done some number of times or until a pre-specified level of proficiency has been reached. Second, many of these procedures increase the amount of oral reading practice that is available through the use of one-to-one instruction, tutors, audiotapes, peer guidance, or other means. In round-robin reading, time was severely limited because the teacher was the only one allowed to provide expert guidance; that is not true of the newer procedures. Third, some of the procedures have carefully designed feedback routines for guiding the reader's performance.* (National Reading Panel, 2000, p. 3-11)

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Repeated reading studies cited by the panel either required students to read for a fixed number of repetitions, or to repeat reading for some amount of time or until some fluency criteria were reached. Other studies had students practicing oral reading while listening to the text being read simultaneously (Van Bon, Boksebeld, Freide, & van den Hurk, 1991; Rasinski, 1990; Smith, 1979), previewing a text through listening (Reitsma, 1988; Rose & Beatty, 1986), or receiving feedback during their oral reading (Anderson, Wilkinson, & Mason, 1991; Pany & McCoy, 1988). (3-15)

The panel reported that guided oral reading had a significant positive impact upon reading achievement. Repeated oral reading improved children's reading accuracy, reading fluency, and reading comprehension as well. Further, the panel reported that classroom practices that employ repeated oral reading with feedback and guidance lead to improvements in reading expertise with both good and struggling readers. Snow, Burns, and Griffin (1998) also endorse practices that promote fluency. They suggest that 1st grade curricula should include the use of frequent "sight words", reading aloud, and independent reading. Snow et al. (1998) conclude that in order to prevent reading difficulties, readers need to achieve fluency with different types of text written for different purposes.

For students to develop fluency with a range of texts, they need adequate practice time reading these texts. The amount to develop automaticity in children has not been established, but an estimate for developing reading fluency in adult learners is about 100 hours of instruction and practice per grade level gained. There is a likelihood that young students will require practice time in this same order of magnitude at least. Some of the ways students can receive enough practice may be through reading aloud to each other in small groups, reading at home to parents or siblings, recording their voice as they read, and by the use of interactive computer programs for reading practice.

Children do not read well silently until they are capable of reading fluently. Fluency is best developed by using oral reading practices and by making reading a positive social experience for the children. For instance, a core set of sight words taught become the base of the children's autonomous lexicon (Perfetti, 1992). Repeated oral reading and oral reading with feedback (e.g., children read to a classmate, to the class, their teacher, or parents). For example, Mathes and Fuchs (1993), Simmons et al. (1994), and Simmons et al. (1995) all provide some evidence for the effectiveness of programs in which students provided peer tutoring to their classmates under the direction of their teachers. Further, according to Dixon-Krauss' (1995) study of partner reading, students were positive about reading to each other and teachers found the program easy to manage. Obviously, students will react well to a program they enjoy and teachers will enjoy teaching with a program that is easily implemented.

Comprehension

Comprehension is a complex and necessary skill that young readers need to develop. The ultimate litmus test of a successful reader is whether they understand (comprehend) the text they are reading. Consequently, comprehension has been described as the "essence of reading" (Durkin, 1993 as cited by NRP 2000). Recently, the National Reading Panel (2000) reviewed the topic of comprehension in the educational literature. The panel identified three important areas of comprehension: vocabulary instruction, text comprehension instruction, and teacher preparation. These areas of comprehension and the panel's findings for each are briefly reviewed below.

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Vocabulary

The National Reading Panel (2000) provides the following rationale for the importance of vocabulary instruction in teaching reading (p. 4-15).

> *As a learner begins to read, reading vocabulary encountered in texts is mapped onto the oral vocabulary the learner brings to the task. That is, the reader is taught to translate the (relatively) unfamiliar words in print into speech, with the expectation that the speech forms will be easier to comprehend. A benefit in understanding text by applying letter-sound correspondences to printed materials only comes about if the resultant oral representation is a known word in the learner's oral vocabulary. If the resultant oral vocabulary item is not in the learner's vocabulary, it will not be better understood than it was in print. Thus, vocabulary seems to occupy an important middle ground in learning to read.*

The panel's (2000) review indicated that there were so many different dimensions of vocabulary instruction it was difficult to provide a strong case for any single instructional program. For their analysis they categorized vocabulary instructional methods into one of two general groups (pp. 4-17):

- *Explicit Instruction.* In explicit instruction, students are given definitions or other attributes of words to be learned. They are often given specific algorithms for determining meanings of words, or they are given external cues to connect the words with meaning. A common example of this technique is the pre-teaching of vocabulary prior to reading a selection. Other common methods of explicit instruction involve the analysis of word roots or affixes.
- *Indirect Instruction.* In indirect instruction, students are exposed to words or given opportunities to do a great deal of reading. It is assumed that students will infer any definitions they do not have. At least one version of the implicit methods simply suggests that students should be encouraged to do wide reading to increase vocabulary. (4-17)

A review of the research literature indicates that vocabulary should be taught both explicitly and indirectly. Explicit instruction is highly effective for vocabulary learning (Tomeson & Aarnoutse, 1998; White, Graves, & Slater, 1990; Dole, Sloan, & Trathen, 1995; Rinalid, Sells, & McLaughlin, 1997). In addition, the more connections that can be made to a specific word, the better it seems to be learned. For example, there is empirical evidence indicating that making connections with other reading material or oral language in other contexts seems to have large effects.

At the kindergarten and 1st grade level, Leung (1992) found evidence that increasing the frequency of a word encountered in the classroom was positively related to children's use of that word. Senechal (1997) provided evidence that pre-kindergarten students showed greater gains in vocabulary when readings were repeated. Leung (1992) also found evidence that reading aloud led to children's incidental learning of vocabulary. Finally, White, Graves, and Slater (1990) found that direct instruction in the areas of decoding and meaning construction aids learning.

Blachowicz and Fisher (2000) suggest that in order for students to learn vocabulary they should be immersed in words and provided with repeated exposure to these words. The NRP's (2000) analysis of the literature mirrors these suggestions. The panel promotes vocabulary instruction that immerses students in words and provides multiple exposures to those words. In addition, the panel suggests that the pre-instruction of vocabulary words is a highly effective strategy.

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Comprehension Instruction

The second area reviewed by the panel was text comprehension instruction. The panel examined 203 articles that reported on the effectiveness of different comprehension instructional practices. The panel's (2000) analyses identified sixteen categories of text comprehension instruction of which seven appear to have a solid scientific basis for concluding that these types of instruction improve comprehension in non-impaired readers. Some of these types of instruction are helpful when used alone, but many are more effective when used as part of a multiple-strategy method. The seven effective types of comprehension instruction are as follows:

- Comprehension monitoring, wherein readers learn how to be aware of their understanding of the material;
- Cooperative learning, where students learn reading strategies together;
- Use of graphic and semantic organizers (including story maps), where readers make graphic representations of the material to assist comprehension;
- Question answering, where readers answer questions posed by the teacher and receive immediate feedback;
- Question generation, where readers ask themselves questions about various aspects of the story;
- Story structure, where students are taught to use the structure of the story as a means of helping them recall story content in order to answer questions about what they have read; and
- Summarization, where readers are taught to integrate ideas and generalize from the text information.

The most often used and scientifically based instructional practices involved teaching children how to ask questions when they read, how to monitor their comprehension, and how to provide summaries of text. Readers engaged in question generation ask themselves who, what, when, where, why, and how questions while reading. Readers engaged in comprehension monitoring keep track of their comprehension processes and take action when these processes break down (Wray, 1994). Readers engaged in summarizing identify the important elements of the text and unite those into a coherent whole (NRP, 2000).

Teacher Preparation

The third and final area of comprehension reviewed by the panel was teacher preparation. According to the panel, not enough emphasis is given to educating teachers about comprehension instruction. Teachers need to be trained to effectively explain what they are teaching, to model proper thinking processes, to encourage students to ask questions, and to keep students engaged in reading (NRP, 2000 paraphrase taken from p. 4-8). The NRP conducted a review of literature that identified 4 studies related to teacher training in this area. All four studies suggest that training teachers is a highly effective way to improve their teaching of comprehension, and in turn, students improve their reading comprehension.

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Part 2

The Need

The need for higher elementary reading achievement is widely recognized in the popular press and the professional literature. Depending upon the context studied, between one-third and two-thirds of elementary children are judged to be below acceptable levels in reading. Here is one of many studies to illustrate this need. In a national test of fourth-grade students in 2000[1], over one-third (37%) demonstrated reading performance below a minimally acceptable level. This problem was particularly acute for students who come from economically disadvantaged backgrounds (60% below basic) and from very urban settings (47% below basic). Lower scores were achieved by Black students (63% below basic), Hispanic students (58%), and American Indian students (57%). In this study, student reading performance was reported at one of four achievement levels –

- *Below Basic:* Less than adequate mastery of reading for fourth grade work.
- *Basic:* Partial mastery of knowledge and skills for proficient work at fourth grade
- *Proficient:* Solid academic performance in reading.
- *Advanced:* Superior performance in reading.

Bar graphs on the next page summarize the key conclusions.

[1] Data Source: U.S. Department of Education. Office of Educational Research and Improvement. National Center for Education Statistics. *The Nation's Report Card: Fourth-Grade Reading 2000,* NCES 2001–499, by P. L. Donahue, R.J. Finnegan, A. D. Lutkus, N.L. Allen, and J. R. Campbell. Washington, DC: 2001.

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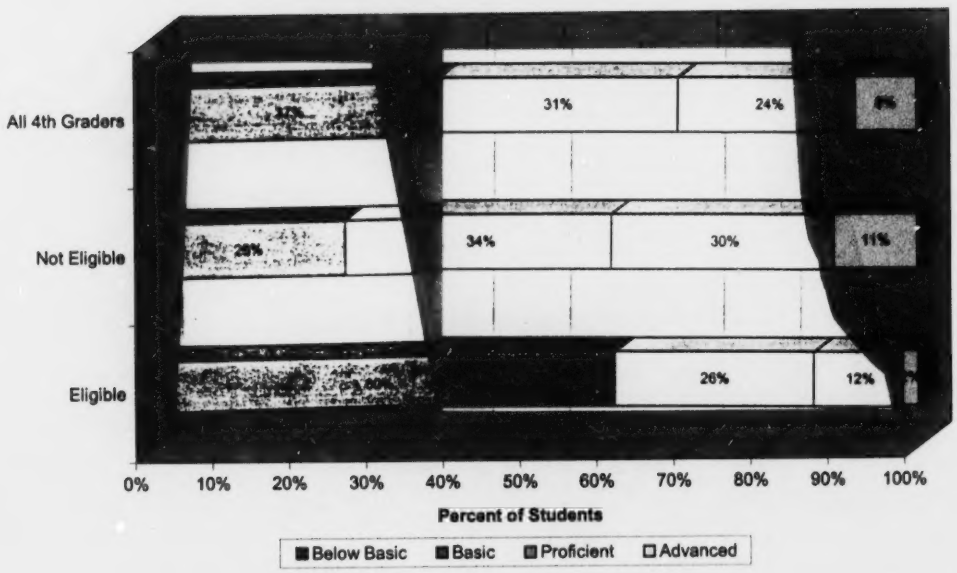
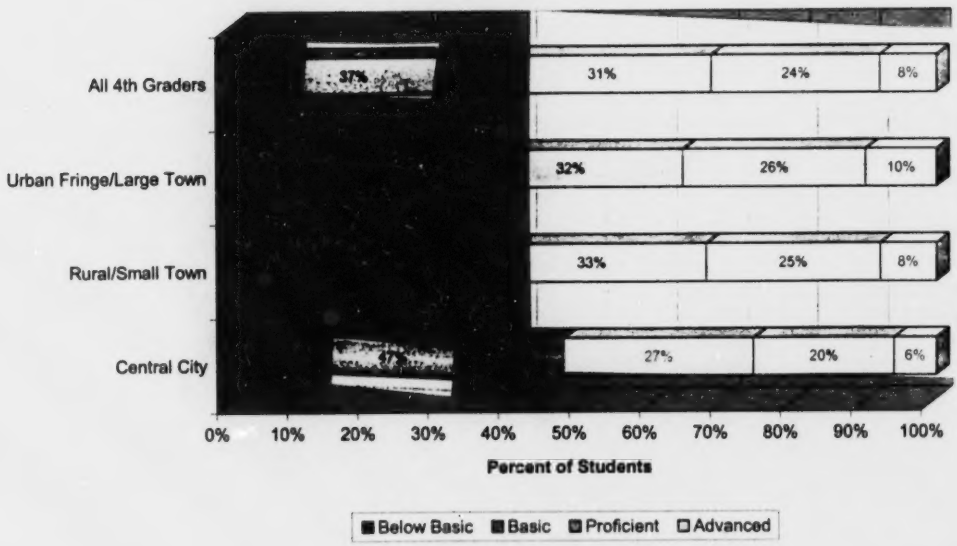
4th Grader Reading Performance by Eligibility for Free/Reduced Lunch



4th Grader Reading Proficiency by Location of School



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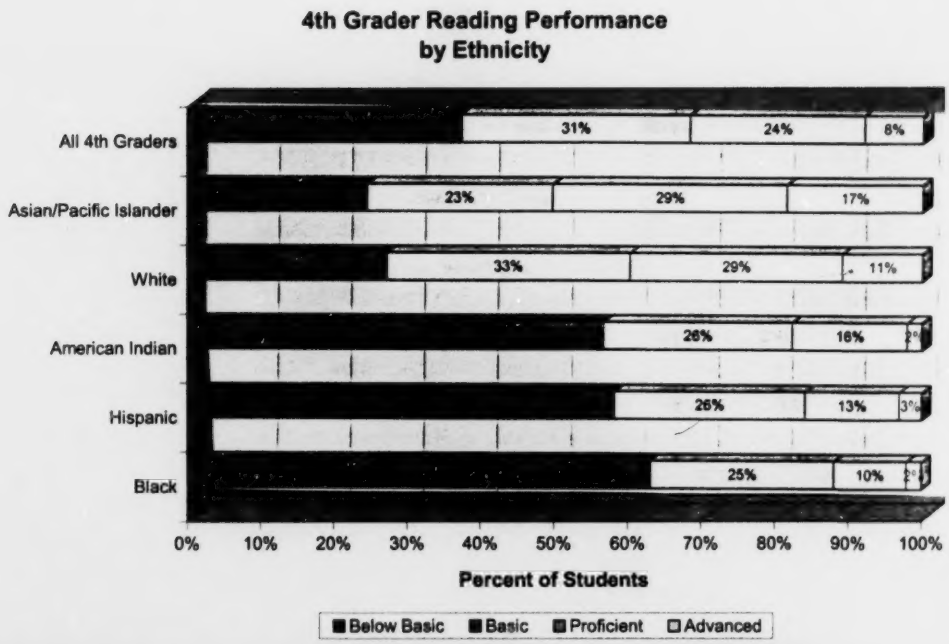

The Need for New Curricula in Beginning Reading

The current low success rate for our students has been with us for many years. If we are to hope for an increase in student achievement we need to start doing something differently, which includes improved research-based curriculum and instruction. New research findings supporting the importance of instruction in phonemic awareness, phonetic strategies, reading fluency, and comprehension call for the development of new reading curricula based upon this research. The reading curriculum needs to have a balance of structured and unstructured elements. Because our goals for reading and literacy are broad, the instructional strategies needed to achieve these goals should also be broad and matched to the goals.

Influence of Standards and Alignments to Tests

The public schools were once a trusted institution imbued with authority, where teachers were encouraged to work hard and teach children by following accepted professional standards. But with the development of a technological society, with research on educational outcomes, high expectations, and easily obtained public information this has all changed. The landmark report *A Nation at Risk* made the status of education a front-page issue. A clamor for improvement, beginning with standards, arose from other major events such as the six National Education Goals (1989), establishment of the National Council on Education Standards and Testing (1991), and Congress's enactment of Goals 2000: Educate America Act (1994).

Five critical elements of accountability systems have been widely accepted:

- rigorous content standards
- tests of student progress
- professional development for standards and tests

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- public reports of student achievement, and
- appropriate results for outcomes[2].

Standards are commonly understood to apply to core academic disciplines and a high achievement level; they should address what students should know and be able to do[3].

States have taken up the call and used federal funding to adjust curriculum frameworks to meet the requirements of existing standardized tests or their own criterion-referenced exams[4]. In fact, only one state (Iowa) has not adopted its own state standards. Although powerful, this movement to standards has not cemented all schools in a state into one course of action. Scott Thompson[5] highlights the fact that many districts are developing their own performance standards, above and beyond the state and national guides.

Standards for reading—the development and adoption of standards for reading growth and performance has helped to bring a climate of greater agreement among educators regarding issues of reading instruction. The resolution, most experts agree, is that no one method is sufficient and that certain elements are critical. Readers need a foundation of skills and strategies, just as they need experience with an ever enlarging amount of good literature.

PLATO Learning has designed its reading curricula with special attention to the standards proposed by the following organizations:

- National Assessment of Educational Progress (NAEP)
- National Council of Teachers of English
- International Reading Association
- SCANS skills for literacy and problem solving

It is these needs, defined by trends in research, standards, and tests, which lead to the development of the *PLATO Beginning Reading for the Real World* curricula. The next section provides an overview of the curricula. Following sections examines each of them in more detail.

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[2] Southern Regional Education Board. Getting Results: A Fresh Look at School Accountability. Atlanta: Southern Regional Education Board, 1998. 31 pages. ED 426 510.

[3] Gratz, Donald B. "High Standards for Whom?" Phi Delta Kappan 81, 9 (May 2000): 681-87. EA 537 202.

[4] Wraga, William G. "The Educational and Political Implications of Curriculum Alignment and Standards-Based Reform." Journal of Curriculum and Supervision 15, 1 (Fall 1999): 4-25. EJ 594 857.

[5] Thompson, S. "Confessions of a 'Standardisto'." Education Week on the Web (October 6, 1999): 5 pages.

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Part 3

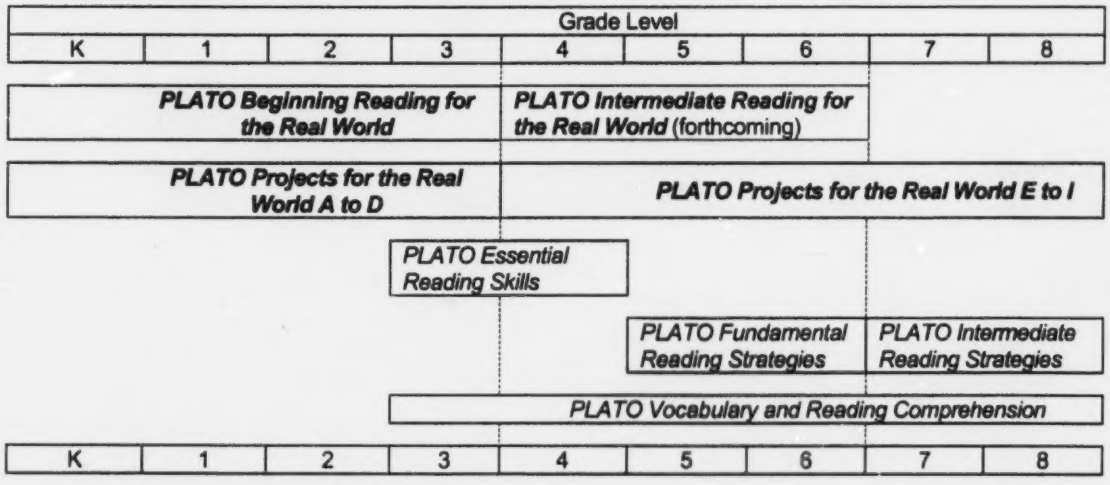
Description of Beginning Reading Courses

PLATO Learning provides resources for beginning reading instruction in grades K through 3 as well as reading resources that can be used in upper elementary and middle school grades. The core early elementary PLATO resources are *Beginning Reading for the Real World*, and *Projects for the Real World* Unit A through D and E through I. These two curricula are reviewed in detail in this paper.

PLATO and the Reading Curriculum

The PLATO reading curricula extend into upper elementary and intermediate and secondary grades through level 14. Not only can the K to 3 curricula be used with older elementary students needing remediation, there is a companion set of curricula relevant to students in grades 4 to 8. *Projects for the Real World*, Units E to I, extends this curriculum into grades 4 though 8. This curriculum is reviewed in detail in this paper. Other PLATO curricula briefly described here but described more fully in Technical Paper #7 are: *Reading Horizons, PLATO Essential Reading Skills, PLATO Fundamental and Intermediate Reading Strategies*, and *PLATO Vocabulary and Reading Comprehension.* PLATO *Advanced Reading Strategies* extends instruction to level 14.

An overview of the PLATO Beginning Reading curricula is presented in the following figure. Grade-level alignments of course segments represent typical use for regular education students. However, teachers may judge whether regular education students in higher or lower grades might benefit from a particular course segment. Also, advanced or special needs students might appropriately use a course labeled for another grade level. ***** NOTE TO REVIEWERS: DO WE WANT TO MENTION THE FORTHCOMING 4-6 READING FOR THE REAL WORLD? *****



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PLATO Curricula and Reading Research

Beginning Reading for the Real World and *Projects for the Real World* are solidly grounded in research on effective reading instruction. The PLATO courses effectively use a variety of instructional strategies, including direct instruction on well-defined skills, and indirect instruction through extensive reading and less structured problem solving activities. The *Beginning Reading* and *Projects for the Real World* courses include extensive practice in the areas of:

- Phonemic awareness and phonological analysis of text
- Building reading fluency
- Developing text comprehension strategies

Phonemic awareness is taught both explicitly and implicitly in the courses. As suggested by research, the *Beginning Reading's* explicit phonemic instruction involves the use of phoneme manipulation with printed text. The course makes extensive use of a few strategies to build phonemic awareness:

- Phoneme isolation, which require recognizing individual sounds in words. For example, 'Mark the words on the screen that start with the /s/ sound.'
- Phoneme identity, which requires recognizing the common sound in different words. For example, 'What is the sound that is the same in the names Bill, Brett, Becca, and Bob?' (/b/)
- Phoneme categorization, which requires recognizing the word with the odd sound in a sequence of three or four words, for example 'Which word does not have the /i/ sound of the letter y? fly, yell, try.' (yell)

In addition, the program provides extensive experiences with text of all kinds, especially with poetry and word games, to help build phonemic awareness. Using both direct and indirect methods the courses systematically builds across the grade levels a foundation of the most basic phonemic skills to harder and more complicated skills in later grades.

The curriculum makes repeated use of word families and rhyming segments to teach reading of new words. This is an example of an analogy phonics instructional strategy. Analogy phonics involves teaching students unfamiliar words by analogy to known words (e.g., recognizing that the rhyme segment of an unfamiliar word is identical to that of a familiar word, and then blending the known rhyme with the new word onset, such as reading *brick* by recognizing that *-ick* is contained in the known word *kick*, or reading *stump* by analogy to *jump*).

Fluency is supported in the curriculum by previewing a text through listening and by having the students read along with a recorded model reader. In addition, the interactive design of the courses allows students to reread a text several times to become more familiar with it. The amount of reading students do in the *Beginning Reading* and *Projects for the New World* courses provides extensive practice with feedback from the computer. This extensive practice is a key element to developing automaticity in reading, a key component in reading fluency and comprehension.

Reading comprehension is one of the outstanding strengths of the *Beginning Reading* and *Projects for the Real World* curricula. The curricula provide extensive vocabulary development by direct instruction, hyper-linked definitions of key or unusual words and phrases, and extensive experience with words in the context of meaningful reading activities. This combination of explicit and indirect instruction is an effective mix for building vocabulary and knowledge about the real world children live in.

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In addition to vocabulary instruction, the courses provide many activities and projects that have the children apply higher order thinking skills to understanding and using the information they read. The courses use the full range of comprehension strategies supported by research, including:

- Comprehension monitoring, where readers learn how to be aware of their understanding of the material;
- Cooperative learning, where students learn reading strategies together;
- Use of graphic and semantic organizers (including story maps), where readers make graphic representations of the material to assist comprehension;
- Question answering, where readers answer questions posed by the course and receive immediate feedback;
- Question generation, where readers ask themselves questions about various aspects of the story;
- Story structure, where students are taught to use the structure of the story as a means of helping them recall story content in order to answer questions about what they have read; and
- Summarization, where readers are taught to integrate ideas and generalize from the text information.

Reading levels are determined by the Spache and Dale-Chall indices at the Elementary levels, with Flesch-Kincaid also used.

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Beginning Reading for the Real World

Beginning Reading for the Real World was designed to give elementary grade users the phonetic and comprehension skills to decode print and make sense of text. This program provides numerous opportunities for students to learn and use letter-sound connections, context cues, comprehension, and reasoning skills in their quest to become independent readers, writers, and thinkers. This curriculum can be used alone or in conjunction with *Projects for the Real World.*

Curriculum Organization

PLATO Beginning Reading for the Real World is divided into four levels (courses) and progresses in difficulty from Kindergarten to third grade. Each level is focused on a theme: pets, solving word mysteries, exploring distant lands, and contributing to the community. The four levels are entitled:

- *Level A. The World of Pets* (Grade Kindergarten to 1)
- *Level B. Around the Block* (Grade K to 2)
- *Level C: Adventure Out!* (Grade 1 to 3)
- *Level D. Help Out!* (Grade 2 to 3)

Each level includes a preview and four to five lessons (total of 24 lessons for the course). Lessons have three to seven activities (total of 108 activities for the course). Most activities can be completed in a class period. Each is accompanied by a paper activity. Thus, the total curriculum provides approximately 100 hours of reading instruction and practice.

Each level, lesson, and activity in Levels A through D starts with a preview to establish an authentic and motivational setting or theme for the learning exercises. All activities have the following parts:

- *Title Screen*: This screen displays the level cover photo, the title of the level and lesson, and the activity title and number.
- *Preview Screen*: The preview tells what the activity is about and establishes a motivational setting for each activity.
- *Activity Screens*: A series of informational and interactive screens asks questions and presents tasks for students who will answer up to twenty questions. Question types include various formats of selecting options, label placement, fill in the blank, and type in a box. Various formats from matching games, cloze tasks, and writing activities are provided for varying ability levels of students. Students who cannot write yet are asked to discuss their answers with someone or to think about them to themselves.
- *How You Did Screen*: Each activity ends with a screen showing the percent of scored questions that were correct, praise if the learner achieved a passing level (default of 80% correct), and a recommendation to go on to the next activity or to redo the activity, depending on whether they achieved a passing score.

Instructional Elements

In *PLATO Beginning Reading for the Real World*, users accompany the PLATO Kids (a diverse online cadre of neighborhood children) on a series of lively adventures, learning phonetic skills along the way. The PLATO Kids serve as mentors and role models throughout the course. As users engage in a variety of online activities, they learn to:

- make letter sound connections
- use semantic/context cues to determine meaning

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- build basic sight vocabulary
- reason and solve problems in real-life situations
- "think out loud" to generate solutions to problems
- comprehend what is read
- play with language in delightful stories, poems, and games
- draw on new skills for various writing opportunities
- share work together

PLATO Beginning Reading for the Real World includes over 15,000 lines of audio for all relevant text on the screens. When the user clicks on any on-screen text the program reads the text aloud. This allows just-beginning readers to have access to the content of the program as they gain reading skills. The audio also helps more advanced readers fine-tune their listening and decoding skills. A cast of over twenty voices bring the PLATO Kids and other characters to life. Additionally, the program includes thousands of vivid and graphic pictures that facilitate comprehension and also make the learning experience more fun.

A highly interactive instructional design requires students to make frequent choices in a meaningful context. Every page requires the learner to interact with the content presented and make choices about what to do next. Throughout the program students are provided a wide array of navigation options, tools and helps. Students can go back and forth between screens. They can exit an activity, lesson, or the entire course and resume later at the place they left off. There are buttons to provide help on what to do next or to get clues for what the right answer might be. They can choose or give answers, change answers, and check their answers for immediate feedback. For screens requesting multiple answers they are often provided the option of erasing all of their answers at once to start over again. Students also have the option of printing out text they input for extended answer screens so the teacher can review them or they can be placed in a portfolio.

The course provides a "workroom" where students can practice and extend what they learn in the activities. Here they can play games, use tools, and find literature connections. The tools available in the workroom include a calculator, a simple word processor area, a paint area, a sound recorder, a timer, a sight word bank and a word factory tool. Students can also modify their computer working environment by changing screen sounds and colors to match their preferences.

Student activity books and teacher resources are provided for offline support of the *PLATO Beginning Reading for the Real World* instruction. Each level has a student activity book. Every online activity has at least one corresponding activity page to give users extra practice using the concepts taught in the activity. Students usually do better when they complete the online work and then do the corresponding activity book pages.

The teacher resources are provided to help educators integrate *PLATO Beginning Reading for the Real World* into their reading curriculum. Activity guides provide a screen-by-screen summary of each activity. These summaries can help teachers plan related activities to be used before and after computer sessions. A skills curriculum lists all the skills taught in each activity. Teachers can use this reference to select computer activities that match the same skills being taught in class. A set of phonics sound cards is provided, along with suggestions for their classroom use. The teacher resources also include lists of related reading materials and projects students can do in or outside of class.

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Using the Course in Your Curriculum

Kindergarten and first grade teachers will in most cases provide the initial instruction on a reading topic covered. (As the year progresses, advanced first graders may be able to begin a topic on the computer.) The computer can be used after a topic is introduced and either before or after student are given worksheets or other reading activities to practice the topic skills. The computer can be used to reinforce, provide practice, and provide resources for class instruction on letter facts and phonemic awareness development.

Second and third grade teachers may also follow this pattern in using the program. In addition, as students develop greater familiarity with the program and independence in their work, it will be possible to assign students topics and projects that they can initially address on their own. This will be particularly true in a more individualized classroom strategy and for serving advanced or remedial-need students.

In all grades, as students use the computer, the teacher should let the learners work with PLATO courseware using a combination of solo work and peer tutoring. Check to see that they are using the skills being taught, and ask them open-ended questions to direct their attention to the relevant skills. Adjust the assignments based upon your observations and program reports to identify learners who are having problems. Give extra attention to students who are progressing slowly, or those whose time on task is low. When activities have written assignments, have students print out their writing and turn them in so you can review the way they are using each reading strategy. A popular strategy for using limited numbers of computers is to break your class into groups, and have them rotate among computer-, paper- and book-based activities.

Assessment and Reporting

Formal assessment of student reading progress is done by other parts of your reading curriculum. Nevertheless, *PLATO Beginning Reading for the Real World* does provide three resources to help with this assessment.

- *Online Reports.* Most online activities are scored, and students will see their scores for each activity immediately after completion. Teachers can get student scores and other information, such as time spent on tasks, by printing reports from the system.
- *Student Activity Books.* Each level has an accompanying activity book to give students extra practice on skills taught. There are checkpoint pages at the beginning and end of each book, plus a form for teachers to keep track of student progress.
- *Writing Skills Checklist.* This checklist is provided in the teacher resources and can help teachers rate and track student writing process and their ability to use phonics skills.

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Level A: The World of Pets

In Level A, users learn about initial consonants and other letter-sound connections as they explore the world of pets. Users help Samia care for a new puppy, learn about everyday and unusual pets, read familiar animal fables, and imagine what it would be like to have fantasy pets. A generous sprinkling of exciting stories, poems, and games helps users practice their newly-acquired skills.

Who are the target students?

This Level is primarily intended for students in kindergarten and the first grade, although it can also be used with older elementary students needing these skills. Level A is designed for beginning readers with little prior print experience who need explicit instruction in the alphabetic principles of reading: letter identification and phonemic awareness skills of distinguishing between phonemes and identifying phonemes in words.

What does it teach?

The primary emphasis of this level is alphabet and phoneme awareness, building print familiarity, and introducing students to text comprehension strategies.

Skill	Content
Letter identification and naming	upper and lower case letters A to Z
Awareness of consonants, word families, and rhyming words	b, c, d, f, g, h, j, k, l, m, n, p, q, r, s, t, v, w, x, y, z; _ad, _ake, _at, _in, _ish; identify rhyming words
Vocabulary	color words, no (many specific words regarding pets and other animals)
Print familiarity	what is a sentence, parts of a book
Writing	letters, names, short stories
Comprehension Strategies	sequencing story events, alphabetic sequencing and matching, predict outcomes, infer a cause, infer a solution

What activities does it present?

Level A is divided into a preview and five lessons, each with six to seven activities (total of 31 activities). *Lesson 1, Activity 2: Play with Names* presents a typical set of activities for this Level. After Samia thinks about the letter B in her new puppy's name she begins to extend this awareness to her own name. Samia then begins to present riddles for the users to answer and all answers must begin with the letter s.
Screen 1: Student clicks on all names beginning with the letter B (review)
Screen 2: Say or type the names you know that begin with B (review)
Screen 3: Click on the "S" in each name
Screen 4: Find picture words that begin with "s"
Screens 5-6: Answer riddles using words that begin with the letter "s"
Screen 7: Type the first letter of Samia's name
Screen 8: Type the first letter of the puppy's name (Bubbles)
Screen 9: Type your favorite letter

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Level B: Around the Block

In Level B, users learn about consonant blends and digraphs (ch, sh, th, wh) as they help Rachel and the other PLATO Kids solve some mysteries. Users practice phonetic skills as they solve neighborhood mysteries, explore neighborhood malls and other locations, decode written messages, and experiment with riddles, tongue twisters, and games.

Who are the target students?

This Level is primarily intended for students in first and second grade; it can also be used by advanced Kindergartners and older elementary students needing these skills. This level is designed for beginning readers with the reading experience and skills contained in Level A or in other instruction. It assumes the learners have reading readiness skills, such as being read to, hearing and repeating rhymes, etc.

What does it teach?

The emphasis of this level is on awareness of consonant blends in different positions in words, building vocabulary, and applying text comprehension strategies.

Skill	Content
Awareness of consonant blends in different positions in words	br, ch, cl, cr, dr, fl, fr, gl, gr, pl, pr, scr, sh, sk, sl, sm, sn, sp, spr, squ, st, str, sw, th, tr, tw, wh, _mp, _nd, _nk, _nt, _st
Vocabulary	compound words, sight vocabulary words
Graphic information	read maps
Writing	taking notes, discussing story endings, personal experiences, mystery solutions, making a list, decoding a message, tongue twisters, poems
Comprehension Strategies	inference and drawing conclusions, identifying statements that are real/not real, identifying cause and effect, using context clues, identify main ideas and story details, story sequence, predicting outcomes, summarize a story, identifying character traits, following directions

What activities does it present?

Level B is divided into a preview and five lessons, each with six to seven activities (total of 33 activities). *Lesson 3, Activity 1: Names and Locations* asks users to decode some messages while practicing completing words with letter blends.
Screens 1-2: Type in the missing letters of a pet owner on a pet-service order form
Screens 3-6: Decode message words starting with squ, scr, sl, and sp by adding missing letters
Screens 7-10: Figure out streets name starting with spr on a smudged map
Screen 11: Accept praise for good work as a "sound" detective

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Level C: Adventure Out!

In Level C users learn about the vowel sounds (short vowels, long vowels, digraphs, r-influenced vowels, silent vowels) and frequently used word families as they "adventure out" into exciting new worlds. Lessons are set in outer space, in the rain forest, in the sea, and in storybook land.

Who are the target students?

Level C is primarily intended for students in first and second grade and for other elementary students needing these skills.

What does it teach?

The emphasis of this level is on short and long vowel sounds, building vocabulary, and applying text comprehension strategies. This level assumes beginning readers have the reading experience and skills contained in Level A and B.

Skill	Content
Awareness of short and long vowel sounds	short sounds of a, e, i, o, u; long vowel pairs of ea, ee, ai, oa; long vowel, final silent e; long i (ight, y); r-influenced vowels of ar, er, ir, or, ur; ow (as in crow) versus ow (as in how); oi and oy; soft and hard c and g; _ave, _ove, _am, _ay, ie, _i_e, igh, _ish, _oi_, _oon, _own, _up, _urse, _ye
Vocabulary	suffixes, contractions, syllables, possessives
Print familiarity	book table of contents
Writing	words with short vowels; write a problem, an explanation, about a meal, an opinion, suggestions, write a fable, advice
Comprehension Strategies	matching problems and solutions, inferring meaning, predicting outcomes, identifying main ideas and details

What activities does it present?

Level C is divided into a preview and four lessons, each with six to seven activities (total of 26 activities). *Lesson 3, Activity 3: A Whale of a Whale* teaches the silent e pattern and other long vowels using a report and a discussion about keeping orca whales in captivity.
Screen 1: Lee sees a show with orca whales and wonders if they should be kept in captivity
Screen 2: Decide what Lee is thinking about keeping whales in captivity
Screens 3-8: Place the missing long vowels in Lee's whale report
Screen 9: Write how you feel about whales being kept in captivity
Screen 10: Yuri shares a book of Alaskan folktales and shares her version of one of them
Screens 11-15: Read Yuri's story and insert the missing long vowels

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Level D: Help Out!

In Level D users learn about silent letters and about word relationships and parts (synonyms, antonyms, homophones, prefixes) as they help out at home, around town, with friends, at school, and with animals.

Who are the target students?

Level D is primarily intended for students in second and third grade. It can also be useful for advanced younger elementary students ready for these skills and for older elementary students in need of basic skills.

What does it teach?

This Level emphasizes vocabulary development as well as awareness of additional rules and applying comprehension strategies to text appropriate for second and third grade.

Skill	Content
Awareness of silent letters and other phonetic rules	silent letters kn, gn, wr, tion; y as a consonant or vowel
Vocabulary	synonyms, antonyms, homophones, prefixes, suffixes, base words and spelling changes
Print familiarity	use an index
Graphic information	read a chart
Writing	variety of writing exercises
Comprehension Strategies	sequence, read for a purpose, identify main idea, identify appropriate sources of information, inference, classify statements as fact or opinion, predict outcomes

What activities does it present?

Level D is divided into a preview and five lessons, each with three to four activities (total of 18 activities). *Lesson 4, Activity 4: Lunch Buddies* teaches the different sounds of "y."
Screen 1: Catalina, our lunch buddy, will teach us the different sounds of the letter "y."
Screen 2: Rules for the consonant "y" sound, along with the /e/ and /i/ sounds of "y," are given
Screens 3-5: Examples of the rule are given for words from posters in the lunch room
Screen 6-16: Practice identifying rules; four words per page with an answer check on each page
Screen 7-17: Mastery test of categorizing words under each of the three rules

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Projects for the Real World A to D and E to I

Projects for the Real World is designed to give elementary grade students authentic practice in applying concepts of listening, producing oral language, writing/publishing, writing/mechanics, comprehension, vocabulary, and sight-sound connections. These cognitive skills are integrated with each other and with authentic concepts of "real life skills" and "social and emotional attitudes". Students receive a special focus on their relationship to others and the environment. The interdisciplinary approach offers students many opportunities to understand how concepts and tasks fit together. The multimedia nature of the program engages children by allowing them to hear text being read and to respond in multiple ways to questions and assignments. When students give answers they receive immediate feedback about their correctness; in many cases they are told why an answer is wrong or how to arrive at a correct answer.

Curriculum Organization

Like its companion curriculum *PLATO Beginning Reading for the Real World*, *Projects for the Real World* is divided into four levels, A-D, designed for kindergarten through third grades. However, unlike *PLATO Beginning Reading for the Real World*, each level is divided into six or seven units, and it is these units that are focused on themes. In Levels A to D there are 26 units, 104 projects, and 485 activities. Assuming that the average project takes a little more than one class period to finish, the total course Levels A to D provides approximately 104 hours of problem solving, reading instruction, and practice. The levels and their projects are listed below:

- Level A: Me; Let's Get Organized; Messages Without Words; I Can Make a Difference; Buy Me! Buy Me!; I Love Animals; Getting Around
- Level B: Plants and Seeds; Working Together; Gift Giving and Appreciation; Fund-raiser; Money; Pets; Grow a Garden
- Level C: Maps; Make a Collection; So Many Ways to Communicate; Fabulous Trees; Keeping Healthy; Neighborhood Animals
- Level D: Body; Books and More; Problem solving; Endangered Animals; Smart Shopper; World of Insects

Levels E through I, planned for grades four through eight, allow for developing maturity and vocabulary of intermediate students. Ascending levels use progressively fewer auditory options and they introduce topics that are more scientific and broad in their scope. Interactivity with the screens is progressively more focused on content, both for topics and for skills in reading, English, and math. In Levels E to I there are 20 units, 141 projects, and 308 activities. Assuming that the average *activity* takes one class period to finish, the total course, Levels E to I, provides approximately 250 hours of problem solving, reading instruction, and practice.

- Level E: Home Health Detective; State Visitors Center; News Desk; Desert Survival
- Level F: School Proposals; Food Bank; Designing a Museum; Climbing Mt. McKinley
- Level G: Volunteering; Yellowstone Connection; Make TV Work forYou; Olympic Games
- Level H: All Kinds of Families; Medical Mix-Up; Consumer Guide; Maya Mystery
- Level I: Earning Money; Trouble in Camelot; Making a Video; Space Center

At each level, all of these units have four projects, or themes, for which usually four to six activities are provided. Each activity has multiple "scenes" that require students to apply various skills. Activities provide authentic tasks—multiple strategies for involving students,

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such as a picture with objects or words that can be moved or a picture to draw by computer. Activities include a variety of learning activities: naming and labeling, sequencing, recall, analysis, sequencing, discrimination, categorization, prediction, and inference. In Levels E through I there is less categorization and more rule using and discrimination as well as more multi-step procedures.

Below is a description of a typical unit in Levels A through D. In Levels E through I there is more complexity in how the unit is organized.

- *Introductory Screens*. When starting a unit, students see introductory screens and an "Opening Unit Photo". Students may click on children in the photo (drawing), whereupon the characters make a statement or ask a question.
- *Survey questions*. Next is a survey that presents a few organizing questions on a clipboard (which is a standard format throughout *PLATO PROJECTS FOR THE REAL WORLD*). These questions can also be used at the end of each unit to demonstrate to students what they have learned.
- *Story or rhyme*. A story or rhyme is then given; students may click on parts of the picture for the text of a story or sentence that is read. If there is a personal letter, for instance, a click on it will elicit an audio reading of the text.
- *Work plan*. When the work plan appears, students may choose which project they want to do first, i.e., the topic they would like to work on first.
- *Project*. Each project has one theme and includes from four to six activities on that theme. Activities are involving. They are modeled after the activities in the reading program, and present many more learning experiences.
- *Activity*. Each activity has one or more screens; each screen uses involvement of various kinds to address content.

Integrated into activities are topics and activities that support positive social and emotional development for children. Repeatedly, text and modeling are used to demonstrate the concepts of cooperation, self-esteem, mutual respect, understanding the feelings of others, problem solving, and sharing.

Instructional Elements

In *Projects for the Real World* learners listen to text being read in a variety of settings. Some of the text is provided by the PLATO Kids as they ask questions and make comments; some text is read by a narrator. As students participate in an activity, they listen, read, and speak; they also move words, phrases, and sentences to label objects, answer questions, complete question formats, and organize text. Writing is a major part of the activities, and students have numerous opportunities to construct text of various kinds. Many activities include games and opportunities to draw pictures as part of hands-on language arts. As with *PLATO Beginning Reading for the Real World*, Projects provides a "workroom" where students can use six work areas (computer tools):

- a Writing Idea Center
- a Library Center that contains the Literature Connection
- an Arts and Crafts Idea Center, and
- an Information Center containing Data Decks, a Game Center, a Portfolio Center, and a Recorder Center.

No matter the level, *PLATO PROJECTS FOR THE REAL WORLD* continue to make use of brilliant colors, multiple characters, and interactive screens. Interest is maintained in a variety of ways. First of all, students can be self-directed in their learning. While they are in an activity they can review former screens at will. Unless students are directed to complete certain projects and activities, there are frequent choices for them to make; thus, they may follow their interests. They can find additional information through the system. Secondly, between levels and within activities, activities are structured to start with

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concrete learning and progress to high levels such as analysis. Third, multiple topics are intertwined throughout, making the exercises multifaceted and integrated. Vocabulary, reading, English, and math concepts are introduced in relation to the umbrella topic. Students learn skills while the context of the topic makes skills more meaningful. For example, many activities require hands-on work before students can give an answer. Fourth, program features such as the ability to print pictures and products makes the computer a more useful tool for learning.

Using the Curriculum

As they use *Projects for the Real World,* students are engaged not only in reading but also in speaking, writing, and many other activities. These experiences require attention and stimulate comprehension. The activities give immediate feedback, which strengthens student understanding and increases their desire to participate. In addition, the social and emotional development strand can help to teach or reinforce attitudes and behaviors that are desirable for children.

Teachers may use *PLATO PROJECTS FOR THE REAL WORLD* for experience in developing comprehension. As it has recently been validated, comprehension does not come from simply reading quantities of material; comprehension—and retention—of text can be facilitated greatly through cognitive strategies. Such strategies are required as students participate in *PLATO PROJECTS FOR THE REAL WORLD* units of study. The requirement for answers and writing, at various cognitive levels, helps to assure that students are "connecting" with what they read. Results of their work demonstrate to them their proficiency.

PLATO PROJECTS FOR THE REAL WORLD can be used to develop skills in reading, English, and math as students pursue a topic of their interest. Unit activities can be integrated with other classroom work, such as library exploration and development of term papers. In addition, the activities expose students to places, people, topics, and workplace options they may not experience otherwise.

Assessment and Reporting

Students receive immediate feedback on program-generated work. For teachers, the management system reports scores on each math and language arts activity as a whole. It also provides the number of activities completed by each student and the time spent on each activity. The program will print student products like drawings, writing samples, and charts. These pages can be added to student portfolios for assessment. Checklists are provided to aid teacher assess their observations of student work.

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Curriculum: Essential Reading Skills and Grammar/Editing Skills

Projects for the Real World Levels A-B (Grades Kindergarten and 1)

Units	Essential Reading Skills	Grammar/Editing Skills
Level A (Kindergarten)		
Unit 1: Getting Around Unit 2: Messages Without Words Unit 3: Let's Get Organized Unit 4: Buy Me! Buy Me! Unit 5: Me Unit 6: Make a Difference Unit 7: I Love Animals	Categorize One or Two Attributes Compare, Contrast Attributes Distinguish Between Fact, Fiction Distinguish Between Numbers and Letters Follow 2-3 Step Directions Identify Story Sequence Infer Answers to Questions Interpret Graphs/Tables Print Familiarity (books, survey forms, and other text formats) Recall Detail Recognize Letters of Own Name Recognize Words: size, weight, speed, size relationships, spatial relationships, color words, relative speed, feelings, opposites, shapes Sort Phrases According to Meaning Use Context to Supply Missing Words or Phrases in a Sentence	Alphabetize List of Names by First Letter Capitalize Names Match Upper/Lower Case Letters
Level B (Grade 1)		
Unit 1:Plants and Seeds Unit 2: Working	Categorize to 1 or 2 attributes Develop sight word vocabulary Develop Vocabulary for Plants, Letter Writing, Pets Discuss Choices and Solutions	Follow 2-3 step directions Retell a Story Write (ideas, directions, table, tell a story, to evaluate, opinions, calendar, invitation, name tags, letter, poem…)

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Units	Essential Reading Skills	Grammar/Editing Skills
Together	Match Phrases and Sentences with Pictures	
Unit 3: Gift Giving & Appreciation	Read and Infer Information (15 activities)	
	Read for Specific Information (10 activities)	
Unit 4: Fund-Raiser	Recall Details	
Unit 5: Money		
Unit 6: Pets		
Unit 7: Grow a Garden		

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Projects for the Real World Levels C-D (Grades 2 and 3)

Units	Essential Reading Skills	Grammar/Editing Skills
Level C (Grade 2)		
Unit 1: Maps Unit 2: Make a Collection Unit 3: So Many Ways to Communicate Unit 4: Fabulous Trees Unit 5: Keeping Healthy Unit 6: Neighborhood Animals	Categorize to 1 or 2 Attributes Compare, Contrast Information Develop and Add to Categories Develop Sight Word Vocabulary Develop Vocabulary (names of shells; univalves and bivalves; trees; animals; months and seasons) Interpret Information and Graph Match Beginnings and Endings of Sentences Read and Infer Information Read for Specific Information (42 activities) Recall detail Recognize and Write Homonyms, Descriptive Words, Similes Recognize Plot Sequence Summarize, Present Information Use Context to Supply Missing Words or Phrases in a Sentence Use Context to Supply Words, Phrases	Alphabetize to Two Places Capitalize Names Follow 2-3 step directions Parts of an Address, Letter Write (fire escape plan, newspaper article, story, letters, phone messages, joke, recipe, form, poster, tree house, brochure, good wishes...)
Level D (Grade 3)		
Unit 1: Body Unit 2: Books and More	Analyze Problems and Match with Solutions Categorizes to 1 or 2 attributes Complete Survey, Observation Form Infer Answers	Alphabetize Fiction, Biographies Categorize Words Go Through Writing Process Learn How to Locate Fiction, Nonfiction, Biographies

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Units	Essential Reading Skills	Grammar/Editing Skills
Unit 3: Problem Solving Unit 4: Endangered Animals Unit 5: Smart Shopper Unit 6: World of Insects	Read for Details, Information (71 activities) Use Context to Supply Words, Phrases Use Graphics to Show Ideas or Illustrate Writing Vocabulary (names of bones, parts of body parts, insects; nonfiction categories; parts of mystery story; "small print" phrases; budget)	Learn some poetry forms Recognize Literature Genres Sequence Directions Write (questions & answers about bones; poster, stories, directions, page for book, poem, ending to a play, character sketch, program for a play, button, poster, letters, questionnaire, about experiences…)

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Projects for the Real World Levels C-D (Grades 4 to 6)

Units	Essential Reading Skills	Grammar/Editing Skills
Level E (Grade 4)		
Unit 1: Home Health Detective Unit 2: State Visitors Center Unit 3: News Desk Unit 4: Desert Survival	Compound Words Contractions Homophones (Multiple meaning words) Long/Short Vowel Sounds Suffixes	Capitalization: Proper Names, Cities, States, Pronoun "I" Commas in a Series Double Negatives End Punctuation Quotation Marks: Direct Quotes Sentence Combining Simple Subjects/Predicates Singular and Plural Nouns Singular and Plural Possessive Nouns
Level F (Grade 5)		
Unit 1: School Proposals Unit 2: Food Bank Unit 3: Designing a Museum Unit 4: Climbing Mt. McKinley	Compound Words Contractions Homophones (Multiple meaning words) Prefixes Root Words Suffixes	Adjectives: Comparative and Superlative Capitalization: Days, Months, Proper Names, Proper Names, Direction/State Abbreviations, Cities, Nouns: Singular and Plural Prepositions/Prepositional Phrases Sentence Combining Sentence Fragments Spelling: Days, Months Street Names Subject/Verb Agreement

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Units	Essential Reading Skills	Grammar/Editing Skills
Level G (Grade 6)		
Unit 1: Volunteering Unit 2: Yellowstone Connections Unit 3: Make TV Work for You Unit 4: Olympic Games	Antonyms/Synonyms	Adjectives: Comparative and Superlative Capitalization/Abbreviation/Punctuation: Personal Titles, Names, Initials, Direction/State Abbreviations, Street Names, Cities, Pronoun "I" Four Types of Sentences Past and Present Participles Past Tense and Past Participle of Irregular Verbs Pronoun Usage/Pronoun Antecedents Quotation Marks: Direct Quotes Sentence Combining Sentence Fragments Simple/Complete Subjects and Predicates Subject/Verb Agreement

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Projects for the Real World Levels C-D (Grades 7 and 8)

Units	Essential Reading Skills	Grammar/Editing Skills
Level H (Grade 7)		
Unit 1: All Kinds of Families Unit 2: Medical Mix-Up Unit 3: Consumer Guide Unit 4: Maya Mystery	Greek Word Roots Similes/Metaphors Synonyms	Capitalization/Punctuation: Dialogue, First Word in Sentence, Acronyms, Proper Nouns Commas: Connect Fragments, Separate Day/Year, City/State, Items in a Series, Set Off Interrupters, Set Off Introductory Words and Phrases Comparative/Superlative Adjectives Complete/Simple Subjects and Predicates Fragments: Run-on Sentences Quotation Marks in Dialogue Subject/Verb Agreement
Level I (Grade 8)		
Unit 1: Earning Money Unit 2: Trouble in Camelot Unit 3: Making a Video Unit 4: Space Center	Antonyms Contractions Homophones (multiple meaning words) Latin Roots	Capitalization/Punctuation: Business and Friendly Letters, Titles, Days/Months, Schools/Institutions/Businesses, School Courses, Languages, Places Double Negatives Prepositions and Prepositional Phrases Pronouns: Compound Subjects and Objects, Singular, Plural, Possessive, To Replace Nouns and Subjects and Objects Sentence Fragments

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Essential Reading Skills

Essential Reading Skills (ERS) is a curriculum of two courses with 32 tutorial lessons, each targeted on a single language skill which is important in reading. The first course, ERS1, includes 22 tutorials with hands-on practice, and corresponding mastery tests which teach basic word skills, ranging from identifying the correct reference of a pronoun through recognizing synonyms and antonyms. These are skills which native speakers generally acquire as they learn to speak, but review of a specific skill may be needed. For non-native speakers and learners with special needs, these are important basic language comprehension skills to learn, and the ERS tutorials may be useful resources.

The second course, ERS2, teaches 10 core reading strategies of importance to all readers beyond the third-grade level, ranging from strategies for defining an unfamiliar word using context clues, through distinguishing facts from opinions. It includes 10 tutorials, each with corresponding application practice and mastery test. Over 100 short reading passages are used.

Using their *PLATO* management system, instructors can select only the ERS lessons each learner needs. They can be included in a curriculum sequence either before instruction begins on *Reading Strategies* (see below), or prescribed (using the placement testing/prescription system, if desired) for review and remediation as the need arises during reading strategies instruction.

For more detail on this curriculum, refer to Technical Paper #7.

Reading Strategies: Fundamental and Intermediate

The two *Reading Strategies* curricula teach 10 cognitive strategies important for reading comprehension. The strategies range from using prior knowledge (*"using what you know"*) to metacognition (*"tracking your understanding"*). Each strategy is taught at two reading levels. *Fundamental Reading Strategies* (FRS) teaches the ten strategies at the 5th grade level, while *Intermediate Reading Strategies* (IRS) teaches them at the 7th grade level in a spiral curriculum structure.

Three curricula, FRS, IRS and *Advanced Reading Strategies* (ARS; see below) form the "cognitive strategy backbone" of PLATO Learning's reading solution. The courses use an appealing "Webzine" structure, built around an on-line multimedia magazine called *PLATO Read!* and *PLATO Read 2*. Learners interact extensively with actual reading tasks, while the magazine's "guest editor" for each issue models for them the cognitive strategies involved. Then, learners practice the strategies, first in a scaffolded environment, then with progressively less scaffolding, until the learners are reading "on their own." In mastery tests, question formats correspond to those commonly used in standardized tests. The two curricula use over 912 passages of varying length. In addition, 48 30-minute off-line activities are included for use as "homework," to build retention and fluency. Six additional Problem Solving Activities (PSA's) teach metacognition. In all the courses include 202 separate learning and assessment activities.

For more detail on this curriculum, refer to Technical Paper #7.

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Vocabulary and Reading Comprehension: Stories and Literature; Information and Expository Text

Vocabulary and Reading Comprehension (VRC) builds vocabulary and automaticity. Each carefully graded set of reading passages, covering grades 3 through 9, is accompanied by comprehension questions. One curriculum covers stories and literature; the other covers information and expository text. The passages are of sufficient length and structure to require use of the reading strategies taught in *FRS* and *IRS*. Passages have approximately 300, 600, or 900 words for grades 3 and 4; and 400, 800, 1200 words for grades 5 – 9. In all, there are 84 comprehension activities which require an average of 30 minutes each to complete.

These exercises are supported by 84 pre-reading vocabulary lessons requiring about 15 minutes of study each. This system, the *PLATO Vocabulary Builder*, fosters a number of memory-building and comprehension-building strategies, combining audio and text.

For more detail on this curriculum, refer to Technical Paper #7.

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Part 4

Teaching with PLATO *Beginning Reading for the Real World*

The PLATO *Beginning Reading for the Real World* curricula are designed to be an on-line resource from initial decoding through the middle-school level. They are useful for teaching age-appropriate reading comprehension strategies at the elementary level. Because the structure is modular and flexible, instructors have a wide range of options for integrating the PLATO courseware into their curricula. In this section, we'll discuss some of the key questions concerning use of PLATO *Beginning Reading for the Real World* as part of a larger reading/language arts curriculum. For further discussion of instructional models and strategies for integrating PLATO into your curricula, see Technical Paper #6.

How much reading teaching should I do online?

Because of the nature of beginning reading, we strongly recommend that your curriculum begin with teacher-lead and other offline reading activities. This is especially so for early elementary students. The PLATO online instruction should be a resource that follows the introduction of skills and topics in class. *PLATO Beginning Reading for the Real World*, *Projects for the Real World*, *Fundamental* and *Intermediate Reading Strategies* have worksheets keyed to specific modules, which you or the learners can print out and use to "bridge" to offline reading. In addition, we recommend that you assign books with high interest value for your learners, and do reading aloud activities as appropriate to your goals. So, at each skill level, we expect this sequence of practice will work best:

Individualized Placement → Teacher-led and other Offline Instruction→ PLATO Online Tutorials and Practice → PLATO Offline Worksheets → Offline Reading of Books and Other Materials

This extended off-line practice is especially important because of the need to build *automaticity*– the ability to perform tasks with minimal cognitive load ("without thinking about it"). This frees up cognitive resources so that learners can focus on developing fluency and meeting higher-level challenges. Research has shown that building automaticity takes extensive practice – over 100 hours per grade level, in reading. Thus, any well-balanced reading program should include considerable free-reading practice at appropriate levels of challenge.

I only have 6-8 computers in my classroom, and there is no lab. How can I use PLATO Beginning Reading?

You can organize your class into activity groups which rotate among on- and offline activities. For example, a group of learners might work for one period online, then in the next period move to a PLATO printed worksheet, then in the next period move to assigned or free reading of books, perhaps with an assignment to write a summary or interpretive essay. You can use the management functions of the computer to assign lessons to

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students, print computer reports to track student progress, and make prescriptions for individual learners. You'll also want to make your computers available outside of class hours, so learners who need to work more slowly can do so.

What should my role be as students use the PLATO courseware?

When introducing students to the programs you may want to explain how the program is organized and demonstrate an activity. As students spend their first days on the programs you will probably want to circulate among them and ask questions to assure that they are using the programs effectively. After they become comfortable with the program you may become more of a "guide on the side." Let the learners work with PLATO courseware, using a combination of solo work and peer tutoring. Watch to see that they are using the skills being taught, and ask them open-ended questions designed to direct their attention to the relevant skills. Individualize assignments, using the PLATO reports to identify daily those learners who are having problems or who are not engaged. Focus on learners who are progressing slowly, or those whose time on task is abnormally low. Each day, intervene proactively with the learners who are having these problems. In activities with written assignments, have learners print out their writing and turn them in daily so you can review the way they are using each reading strategy.

How can I reinforce the cognitive strategies PLATO courseware teaches?

In off-line practice, model the strategies used in the *PLATO Beginning Reading for the Real World* and *Projects for the Real World lessons*. Also, be sure to ask questions which require inference ("why?" and "prediction" questions) as well as occasional facts ("what?" questions). In your off-line reading instruction, balance the "top down" emphasis on cognitive strategies (preferably the ones used in PLATO) and metacognition with the "bottom up" emphasis on decoding and parsing words, phrases, and sentences. You should model both kinds of work, and ask your learners to engage in both as they read anything. Note that the cognitive strategies are often selected based on the purpose for reading. Therefore, make sure that your learners always know their purpose when you assign (or they select) any reading task.

Can I use PLATO reading courseware with my ESL/LEP learners?

The PLATO reading curricula aren't designed specifically as a complete solution for ESL/LEP use, but we have included many features which will make the courseware useful for these learners as part of their ESL curriculum. For example, audio, with replay, is available in most activities. Many unusual terms are defined in PLATO courses. The on-line dictionary in upper-level PLATO courseware allows learners to look up any word. In addition, the PLATO *Vocabulary Builder* provides vocabulary practice. If you use the *Vocabulary Builder Editor*, you can add your own additional vocabulary teaching to support other curriculum activities.

Can I use PLATO reading courseware with my LD learners?

The PLATO reading curricula aren't designed specifically as a complete solution for learning disabilities, but many of the principles of instructional design used in PLATO are based on the same learning theory as recognized teaching techniques for the learning disabled. Consequently, LD teachers will find the self-paced structure, small steps with immediate feedback, and extensive practice to be particularly useful with LD learners. However, the lively multimedia design of PLATO courseware may not be appropriate for all LD learners, so be sure to review lessons before including them in individual learning plans (ILP's).

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Do I have to use the PLATO modules in their published order?

In general, the answer is "no." As with all PLATO curricula, we strongly recommend that you carefully select all learning activities relevant to your state and local curriculum standards. Many such alignments are available from PLATO Learning, and training is available to show you how to build your own and incorporate additional off-line activities. Reading as a content/skill area is not particularly sequential in structure, so any one of several reasonable sequences can be devised. The *Beginning Reading for the Real World* course generally assumes that learners using the later levels (B through D) have prerequisite skills comparable to those taught in earlier levels (A through C). *Projects for the Real World* is less sequential in nature and a teacher may select a subset of lessons and activities to meet the needs of the class and the students.

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About the Authors

David W.(Bill) Quinn is currently working as an independent evaluator specializing in evaluating technology use for learning and teaching. He is particularly interested in supporting beginning literacy instruction with technology. He received a doctorate in educational evaluation from Western Michigan University in 1978 and a Masters in Instructional Science from Brigham Young University in 1975. Dr. Quinn had conducted numerous evaluation studies for clients in K-12, university, not-for-profit social services, and for-profit training companies. For ten years at the North Central Regional Educational Laboratory he was a Senior Program Associate where he managed the evaluation unit and evaluated technology use for the states of Indiana and Virginia, and for school districts in Chicago, Miami-Dade, and Los Angeles County. In the area of curriculum development and instructional design, Dr. Quinn directed a beginning reading curriculum development project at NCREL. He also oversaw the design and development of an Internet resource of research-based strategies for raising student achievement in K-12 schools. He is the author of articles, reports, and book chapters on evaluating technology use in education, beginning reading instruction, and development of successful educational programs.

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Prior to joining PLATO Learning, Inc., Dr. Foshay was for 8 years the Director of Product Quality Assurance, Standards and Training of Applied Learning International, Inc. (ALI) and its predecessor companies. Before joining ALI, Dr. Foshay served for 4 years on the faculty of the University of Illinois - Champaign. He began his career as a high school teacher and district media coordinator.
Dr. Foshay has published over 50 major journal articles, book chapters, and PLATO *Technical Papers*. He serves as a consulting editor to three research journals. Dr. Foshay has served on the Board of the International Society for Performance Improvement (ISPI). He was a founding member of the International Board of Standards for Training, Performance and Instruction (IBSTPI). He served on the ASQ/ANSI working group which developed ISO 9000 guidelines for quality management of education and training. Dr. Foshay has received awards from Indiana University, ISPI, and the Association for Educational Communications and Technology.
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